REMARKS

Applicant respectfully requests reconsideration and allowance of the subject application in view of the amendments and the remarks to follow. Claims 1, 3, 5, 7, 11, 18, 20 and 25 have been amended. Claims 1-27 are pending in this application.

The amendments to claims 1, 3, 5, 7, 11, 18, 20 and 25 address minor informalities noted during review and are not intended to alter the scope of the claims. No new matter is added by the amendments to the claims.

35 U.S.C. § 103

Claims 1-17 and 19-22 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,580,430 to Hollis et al. (hereinafter "Hollis"). Claim 18 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Hollis in view of Published U.S. Patent Application No. 2001/0030648 to Deering (hereinafter "Deering"). Claims 20-22 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Hollis in view of U.S. Patent No. 6,545,685 to Dorbie (hereinafter "Dorbie"). Apparently, claims 20-27 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Hollis in view of Dorbie. Applicant respectfully disagrees and requests reconsideration.

The Office Action states (p. 4, item 4) that "Claims 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hollis in view of Dorbie", however, the subsequent text on page 5 refers to claims 21-27. Applicant assumes that the Examiner had intended to reject some or all of claims 20-27 on such grounds, however, unfortunately, the Office Action is void of any discussion whatsoever as to any application of the disclosure of Dorbie to any of claims 23-27, newly presented in the last Response. As such, it is impossible for Applicant to respond to such rejection of claims presented as a matter of right by Applicant.

In the event that the Examiner intends to reject such claims, clarification of the rejection is respectfully requested in an Office Action touching on the merits of such claims and which also resets the period for response to this Office Action.

In traversing the rejection, it is helpful to first review the teachings of the reference(s).

Hollis is directed (see, e.g., Title) to a "Method and apparatus for providing improved fog effects in a graphics system". Hollis teaches (Abstract) "A graphics system including a custom graphics and audio processor produces exciting 2D and 3D graphics and surround sound. The system includes a graphics and audio processor including a 3D graphics pipeline and an audio digital signal processor. Improved fog simulation is provided by enabling backwards exponential and backwards exponential squared fog density functions to be used in the fog calculation. Improved exponential and exponential squared fog density functions are also provided which provide the ability to program a fog start value. A range adjustment function is used to adjust fog based on the X position of the pixels being rendered, **thereby preventing range error as the line of sight moves away from the Z axis**. An exemplary Fog Calculation Unit, as well as exemplary fog control functions and fog related registers, are also disclosed."

Hollis employs a label "alpha" to represent angular deviation from the Z axis, stating (col. 10, line 59 et seq.; see Fig. 7) that "The eye-space z used for fog calculations, in the manner described above, does not represent the correct range unless the viewer is facing the same direction as the Z axis. Specifically, as shown in FIG. 7, if only the eye-space z is used for determining the range, and increasing error will result as the line of sight moves away from the Z axis. As shown in FIG. 7, the range error, represented by shaded portions 610a and 610b, increases as the angle .**alpha**. increases away from the Z axis. However, in accordance with a preferred embodiment of the instant invention, **a range adjustment factor based upon the x value is used to compensate for this inaccuracy**. The range adjustment or fog compensation function effectively increases the fog density

towards the edges of the screen in order to make the fog effect more accurate and realistic."

In contrast, Applicant calculates an effective attenuation factor, also, but coincidentally, designated by the word "alpha". See, for example, at least text appearing at p. 4, line 15 et seq. ("Travel distance information is then obtained in an alpha channel."), text appearing at p. 14, line 15 et seq. ("In step 430, travel distance information in the alpha channel is then converted to a fog factor (also called an attenuation factor)."), Figs. 4, 5A, 5B, 6 and 7B through 7E and supporting text, e.g., page 14, line 1 et seq.; and Eqs. 1 through 7.

Applicant does this by first deriving volume object data representative of fog regions (see step 410, page 13, line 13 et seq.), determining travel distance information (see step 420, page 14, line 1 e seq.), obtaining total travel distance information in a alpha channel (see page 14 line 11 et seq.), converting such to a fog factor (see step 430, page 14, line 15 et seq.) and then blending such with color information (see step 440, page 14, line 16 et seq.).

Thus, it is clear that Hollis provides no teaching of storing distance information in an alpha channel. Hollis uses alpha to represent angular information, in other words, a different and incommensurate quantity than the subject matter recited in Applicant's claims.

The present and previous Office Actions each correctly state (p. 2) that "Hollis does not explicitly disclose storing this information in an alpha channel." Each such Action then incorrectly states that "At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to store fog boundary information in an alpha channel. One of ordinary skill in the art would

have been motivated to do so because regardless of the name being applied ("alpha channel" in this case), it is just a device being used to store graphics data." It does not make sense to interchange angular data, as taught by Hollis vis-à-vis "alpha", with distance or scaled distance information vis-à-vis Applicant's "alpha channel". Why would one choose to interchange angular and distance information, rather than choosing to interchange, for example, color and shape or distance information? There is simply no guidance in the references to support the conclusions presented in the Office Actions.

Claim 1 recites "A method comprising: determining a distance between a user to boundaries of a gaseous volume; and storing the distance in an alpha channel to arrive at an alpha value", while claim 7 recites "One or more computer-readable media comprising computer executable instructions that, when executed, perform a method comprising: determining a distance between a user and a boundary of a gaseous volume; and storing the distance in an alpha channel to arrive at an alpha value", which is not taught, disclosed, suggested or motivated by Hollis.

The Office Action (p. 2) refers to col. 12, lines 33 and 34 for the proposition that Hollis teaches storing distance information. This passage makes reference to Z variables used to represent "screen space". This passage is void of any mention of storage of anything.

Hollis defines (col. 8, line 62 et seq.) "screen space" as a transformed set of coordinates, stating that:

> Transform unit 300 performs a variety of 2D and 3D transform and other operations 300a (see FIG. 5). Transform unit 300 may include one or more matrix memories 300b for storing matrices used in transformation processing 300a. Transform unit 300 transforms

> incoming geometry per vertex from object space to screen space; and transforms incoming texture coordinates and computes projective texture coordinates (300c). Transform unit 300 may also perform polygon clipping/culling 300d. Lighting processing 300e also performed by transform unit 300b provides per vertex lighting computations for up to eight independent lights in one example embodiment. Transform unit 300 can also perform texture coordinate generation (300c) for embossed type bump mapping effects, as well as polygon clipping/culling operations (300d).

"Screen space", as defined by Hollis, is not a "a distance between a user to boundaries of a gaseous volume", as recited in claim 1, and further, Hollis provides no teaching of "storing any such distance in an alpha channel to arrive at an alpha value", as also recited in claim 1.

Both Hollis and the Office Action are silent with respect to any "One or more computer-readable media comprising computer executable instructions that, when executed, perform" the method as recited in claim 7. The passage (col. 6, line 47) cited in the Office Action (p. 3) is a portion of a paragraph (col. 6, line 42 et seq.) that states:

> In this example, main processor 110 (e.g., an enhanced IBM Power PC 750) receives inputs from handheld controllers 108 (and/or other input devices) via graphics and audio processor 114. Main processor 110 interactively responds to user inputs, **and executes a video game or other program supplied, for example, by external storage media 62** via a mass storage access device 106 such as an optical disk drive. As one example, in the context of video game play, main processor 110 can perform collision detection and animation processing in addition to a variety of interactive and control functions.

This passage is unrelated to the subject matter recited in claim 7, and appears to employ an improper "obvious to try" rationale for attempting to find unpatentability. This is discussed in MPEP 2145(X)(B), entitled "Obvious To Try Rationale". This MPEP passage states that "An applicant may argue the examiner is applying an improper "obvious to try" rationale in support of an obviousness

rejection. "The admonition that 'obvious to try' is not the standard under § 103 has been directed mainly at two kinds of error. In some cases, **what would have been 'obvious to try' would have been to** vary all parameters or **try each of numerous possible choices until one possibly arrived at a successful result**, where the prior art gave either no indication of which parameters were critical or **no direction as to which of many possible choices is likely to be successful**. . . . In others, what was `obvious to try' was to explore a new technology or general approach that seemed to be a promising field of experimentation, where the prior art gave only general guidance as to the particular form of the claimed invention or how to achieve it." *In re O'Farrell*, 853 F.2d 894, 903, 7 USPQ2d 1673, 1681 (Fed. Cir. 1988) ...."

The cited passage does not provide the subject matter of claim 7 and provides no guidance whatsoever to cause the artisan to adapt the storage media of Hollis from providing a video game to performing another function, such as is recited in claim 7.

Claim 8 recites "A system for displaying a volumetric gaseous phenomenon in a scene, comprising: an alpha channel, configured to receive travel distance information about the gaseous phenomenon; a fog unit, configured to receive the travel distance information from the alpha channel and covert the information to a fog factor value; and a blending unit, configured to blend a color of the gaseous phenomenon with a color from the scene based on the fog factor value to produce a pixel", which is not taught, disclosed, suggested or motivated by Hollis.

The Office Action cites (p. 3) col. 9, lines 60-67 with reference to claim 8. That passage is reproduced below:

> Fog Simultaion [sic]
> When fog is enabled, a constant fog color is blended with the pixel color output from the last active Texture Environment (TEV) stage. The percentage of fog color blended depends on the fog density, which is a function of the distance from a viewpoint to a quad (2.times.2 pixels). In this example, the graphics processor 114 preferably supports five types of fog each of which provides a different fog density function.

This passage is void of any mention of any alpha channel, as recited in claim 8. This passage is also void of any mention of such an alpha channel configured to receive travel distance, as also affirmatively recited in claim 8. This passage is further void of any mention of "a fog unit, configured to receive the travel distance information from the alpha channel and covert the information to a fog factor value", as recited in claim 8. This passage is additionally void of any mention of any "blending unit, configured to blend a color of the gaseous phenomenon with a color from the scene based on the fog factor value to produce a pixel", as recited in claim 8.

Claim 14 recites "A method for rendering volumetric fog or other gaseous phenomena, comprising: receiving volume object data that defines at least one three-dimensional bounded volume region; and obtaining travel distance information in an alpha channel, the travel distance information being a function of distances in each three-dimensional bounded volume region having a face between a respective pixel and a reference point", which is not taught, disclosed, suggested or motivated by Hollis.

Claim 19 recites "A system for rendering volumetric fog or other gaseous phenomena, comprising: means for receiving volume object data that defines at least one three-dimensional bounded volume region; and means for obtaining travel distance information in an alpha channel, the travel distance information

being a function of distances in each three-dimensional bounded volume region having a front face between a respective pixel and a reference point", which is not taught, disclosed, suggested or motivated by Hollis.

The Office Action states (p. 6) that "[t]he applicant argues (beginning on the first paragraph of page 25) that "alpha" as used by Hollis refers to angular deviation, while in this case it refers to distance data, and it would be erroneous to interchange them. The examiner disagrees with this contention. The alpha referred to by the examiner (see Hollis, col. 9, lines 30-35) refers to overlaying colors ("modulation") and is apparently different from the "α" referred to by applicant. The Examiner has pointed to a different section of the Hollis reference above that teaches storing distance information (col. 12, lines 33-34)." As noted above, col. 12, lines 33 and 34 fails to support either the notion that Hollis discusses distance information in that passage or storage of anything.

The passage at col. 9, lines 27-36 is similarly unrelated to the subject matter of Applicant's claims. That passage is reproduced below:

> Texture unit 500 outputs filtered texture values to the texture environment unit 600 for texture environment processing (600a). Texture environment unit 600 blends polygon and texture color/alpha/depth, and can also perform texture fog processing (600b) to achieve inverse range based fog effects. Texture environment unit 600 can provide multiple stages to perform a variety of other interesting environment-related functions based for example on color/alpha modulation, embossing, detail texturing, texture swapping, clamping, and depth blending.

There is no discernible relationship between color/alpha modulation as noted in this passage and the subject matter of any of Applicant's claims. The arguments contained in the Office Action oblique to such an extent as to appear to be foggy to the point of complete opacity and fail to show how the disclosure of

Hollis could possibly render Applicant's claims unpatentable. Clarification of the rejection and establishment of a logical relationship between the elements recited in the claims and the disclosure of the reference are respectfully requested.

As noted above, Hollis does not teach use of an attenuation channel or storage of such information. As a result, Hollis fails to provide the elements recited in any of claims 1, 8, 14 or 19 or claims dependent therefrom. For at least these reasons, the rejection of claim 1, 8, 14 or 19 and claims dependent therefrom is prima facie defective and should be withdrawn, and claims 1, 8, 14 or 19 and claims dependent therefrom should be allowed.

Deering is directed (see, e.g., Title) to a "Graphics system configured to implement fogging **based on radial distances**" (emphasis added). Deering teaches (Abstract) that: "A graphics system configured to implement fogging according to **an improved method based on radial distances**. The amount of fog applied varies **based on a spherical or radial distance from an object to a viewpoint**. In another embodiment, **the amount of fogging applied may depend on the cylindrical distance form** [sic] **an object to a viewpoint**. Fogging cylinders or spheres may be used to define fogging regions where the amount of fogging is applied according to different mathematical functions."

In contrast, claim 18 recites that "the travel distance information comprises scaled total travel distance information, the scaled total travel distance information being equal to the sum of distances through each three-dimensional bounded volume region along a ray between a respective pixel and a reference point scaled by a scaling value", which is not taught, disclosed, suggested or motivated by Hollis and/or Deering, alone or in any proper combination.

The Office Action (p. 4) refers to paragraphs 20 and 56 of Deering. Paragraph 20 is cited for the proposition that "Deering discloses a graphics system to render 3D objects obscured by fog where the fog depends on the radial distance from the object to the viewpoint". However, this is unrelated to the subject matter of claim 18, which recites travel **distance** information and derivation of such.

Paragraph 56 is cited for the proposition that "Deering teaches ... including scaling the object." This passage states that "Transformation refers to manipulating an object and includes translating the object (i.e., moving the object to a different location), scaling the object (i.e., stretching or shrinking), and rotating the object (e.g., in three-dimensional space, or "3-space")." Such is completely unrelated to any scaled distance value, and completely fails to provide any teaching, disclosure, suggestion or motivation for "the scaled total travel distance information being equal to the sum of distances through each three-dimensional bounded volume region along a ray between a respective pixel and a reference point scaled by a scaling value", as recited in claim 18.

Hollis and Deering are both concerned with angular deviations or coordinates and neither is concerned with use of travel distance information to derive an effective attenuation factor or scaled total travel distance information, as recited in claim 18. As such, the proposed combination fails to provide the subject matter of claim 18 and in fact is inapposite thereto. For at least these reasons, the rejection of claim 18 is prima facie defective and should be withdrawn, and claim 18 should be allowed.

Dorbie is directed (see, e.g., Title) to a "Method and system for efficient edge blending in high fidelity multichannel computer graphics displays". Dorbie

teaches (Abstract): "A method for implementing edge blending between a first and second video frame to create a seamless multichannel display system. The method is implemented in a graphics computer system including a processor coupled to a memory via a bus. Within the computer system, a first video frame is rendered for display on a first video channel. A second video frame is rendered for display on a second channel. A first overlap region is rendered onto the first frame to obtain a first blended video frame. A second overlap region is blended onto the second frame to obtain a second blended video frame. The first blended video frame from the first channel and the second blended video frame from the second channel are then combined such that the first overlap region and the second overlap region correspond, thereby forming a seamless junction between the first blended frame and the second blended frame and implementing a high fidelity multichannel display."

In contrast, claim 20 recites "A system for rendering volumetric fog or other gaseous phenomena, comprising: volume object data that defines at least one three-dimensional bounded volume region; a one-dimensional texture stored in texture memory; a graphics subsystem that obtains travel distance information in an alpha channel, the travel distance information being a function of distances in each three-dimensional bounded volume region having a front face between a respective pixel and a reference point; and an alpha buffer that stores the obtained travel distance information in an alpha channel for each pixel that covers one or more of the three-dimensional bounded volume regions", which is not taught, disclosed, suggested or motivated by Hollis and/or Dorbie, alone or in any proper combination.

Claim 23 recites "A computer usable storage medium having stored therein instructions configured to render images having atmospheric effects by causing one or more processors to: define volume object data corresponding to at least one three-dimensional bounded volume region; derive one-dimensional texture information; store the one-dimensional texture information in texture memory; obtain travel distance information that is a function of distances in each three-dimensional bounded volume region having a front face between a respective pixel and a reference point; and store data representing the obtained travel distance information in an alpha buffer coupled to an alpha channel for each pixel that covers one or more of the three-dimensional bounded volume regions", which is not taught, disclosed, suggested or motivated by the cited references, alone or in any proper combination. Inasmuch as the Office Action fails to provide any clue as to how the Examiner proposes to relate the subject matter recited in claim 23 to any of the references, Applicant is unable to formulate a meaningful response to the "rejection" of claim 23 or claims dependent therefrom.

However, Applicant notes that the references are void of anything to "derive one-dimensional texture information", "store the one-dimensional texture information in texture memory", "obtain travel distance information that is a function of distances in each three-dimensional bounded volume region having a front face between a respective pixel and a reference point" or "store data representing the obtained travel distance information in an alpha buffer coupled to an alpha channel for each pixel that covers one or more of the three-dimensional bounded volume regions", as recited in claim 23. The Office Actions are similarly silent with respect to such subject matter. As such, it is inconceivable that the

references could, in any proper combination, provide the elements recited in such claims or otherwise render such subject matter unpatentable. Clarification of the rejection, and establishment of some legally appropriate relationship between the claimed subject matter and the cited references, is respectfully requested.

As noted above, Hollis is inapposite to the subject matter of Applicant's claims. Dorbie is not cited as curing these deficiencies of Hollis. As a result, the rejection of claim 20, and thus of claims 21 and 22, is prima facie defective and accordingly should be withdrawn, and claims 20-22 (or 20-27) should be allowed.

Further, with respect to all of the rejections, the Office Action fails to establish a prima facie case of obviousness. Applicant notes that criteria for such are set forth in MPEP §2143, entitled "Basic Requirements of a Prima Facie Case of Obviousness" (see also MPEP §706.02(j)).

This MPEP section states that "To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings." No appropriate motivation or guidance has been identified in the references by the Office Action to modify or combine the reference disclosures.

This MPEP section also states that "Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations." As noted above, the references fail to teach or suggest all of the recitations of any of the Applicant's independent claims.

More specifically, none of the references discuss any distance from a user, any travel distance, storage of such in any alpha channel and other features as explicitly pointed out hereinabove (see above arguments). As such, there can be no reasonable expectation of success.

This MPEP section further states that "The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991)." This requirement is also described in MPEP §2143.01, entitled "Suggestion or Motivation To Modify the References." This MPEP portion includes a subsection stating that "THE PRIOR ART MUST SUGGEST THE DESIRABILITY OF THE CLAIMED INVENTION".

Inasmuch as the prior art references are silent with respect to the problem to be solved, it is inconceivable that combining the teachings of the references could suggest the desirability of the claimed subject matter. As a result, the rejection fails all prongs of the test set forth in the MPEP for a prima facie finding of unpatentability.

The statements to the effect that the subject matter of Applicant's claims "would have been obvious" are completely unsupported by the cited references. As such, they must be impermissible hindsight reconstruction based on Applicant's own disclosure.

The Examiner is reminded that hindsight reconstruction is not an appropriate basis for a §103 rejection. (*See, e.g., Interconnect Planning Corp. v. Feil*, 227 USPQ 543, 551 (Fed. Cir. 1985); *In re Mills*, 16 USPQ2d 1430 (Fed.

Cir. 1990) (explaining that hindsight reconstruction is an improper basis for rejection of a claim).)

Moreover, with respect to all of the unpatentability rejections, no evidence has been provided as to why it would be obvious to modify the teachings of the reference(s). Evidence of a suggestion to combine or modify may flow (i) from the prior art reference itself, (ii) from the knowledge of one skilled in the art or (iii) from the nature of the problem to be solved. However, this range of sources does not diminish the requirement for actual evidence. Further, the showing must be clear and particular. See *In re Dembiczak*, 175 F.3d 994, 998 (Fed. Cir. 1999).

For at least these reasons, the unpatentability rejection of claims 1-27 is prima facie defective and should be rescinded, and claims 1-27 should be allowed.

Deficiencies in Examination

The Examiner's response to argument is deficient in multiple regards. A first deficiency is that the response to argument clearly fails to respond to Applicant's arguments with respect to the rejections under 35 U.S.C. §103, or, in the alternative, is an admission that these rejections are defective.

Applicant notes the requirements of MPEP §707.07, entitled "Completeness and Clarity of Examiner's Action". This MPEP section cites 37 CFR §1.104, entitled "Nature of examination" which in turn states, in subsection (b), entitled "Completeness of examiner's action" that "The examiner's action will be complete as to all matters, except that in appropriate circumstances, such as misjoinder of invention, fundamental defects in the application, and the like, the action of the examiner may be limited to such matters before further action is made."

This MPEP section further states, in subsection (f) thereof, entitled "Answer All Material Traversed", that "Where the requirements are traversed, or suspension thereof requested, the examiner should make proper reference thereto in his or her action on the amendment. Where the applicant traverses any rejection, the examiner should, if he or she repeats the rejection, take note of the applicant's argument and answer the substance of it." and also states, under a heading labeled "Examiner Note" that "The examiner must address all arguments which have not already been responded to in the statement of the rejection." The Office Action clearly fails to comport with these requirements as set forth in the MPEP, at least because the Office Action both fails to address Applicant's arguments with respect to unpatentability and continues to reject claims as being unpatentable.

A second deficiency is that the combinations used in the unpatentability rejections fail to provide all of the features recited in any of Applicant's independent claims. The Examiner has ignored these features without providing any appropriate legal basis for doing so.

A third deficiency is the failure to respond to all arguments traversing the unpatentability rejections. Merely repeating that "it would be obvious" to provide the features recited in the claims does not constitute a basis for rejection of the claims, particularly when the references fail to provide the features recited in the claims and the rejections fail to meet the standards for such rejections as set forth in the MPEP and as demonstrated by Applicant.

A fourth deficiency is to combine the teachings of disparate references absent any guidance in the references to support the combination. The Examiner has completely failed to respond to Applicant's legal arguments showing this to be the case.

A fifth deficiency is a complete failure to apply the teachings of the cited references to the subject matter of any of claims 23-27 in attempting to show grounds for rejection of such claims.

For at least these reasons, the Office Action fails to comport with appropriate standards for examination. The Examiner should either allow Applicant's claims or provide a meaningful basis for rejection and an appropriate response to Applicant's arguments.

Conclusion

Claims 1-27 are in condition for allowance. Applicant respectfully requests reconsideration and issuance of the subject application. Should any matter in this case remain unresolved, the undersigned attorney respectfully requests a telephone conference with the Examiner to resolve any such outstanding matter.

Respectfully Submitted,

Date: June 10, 2004

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